REMARKS

Claim 9 has been amended to change the wording "by using a calculated main component measurement vector" as specified in the evaluation means to read "by using the calculated main component measurement vector". Since the corresponding independent method claim 1 already contains the term "by using the calculated main component measurement vector", the independent apparatus claim 9 is fully parallel to independent claim 1. This amendment does not introduce any new subject matter because this wording already appears in claim 1.

Claims 1-19 stand rejected under 35 USC 102(b) as fully met by Stark US Patent 5,568,400. The Examiner asserts that the applicant's invention does not describe "detecting an end of a process by acquiring information of this process and performing a main component transformation of acquired information in order to obtain an indicator for deciding whether the process has ended or not" (see page 6, second paragraph of the Office Action). The Examiner's assertion is respectfully traversed.

Applicant's Independent claim 1 recites a method for monitoring a process containing a first step of "repeatedly acquiring at least two different pieces of information of the process". According to the general usage of patent language, it is clear from the term "the process" that the process from which the information of the process is acquired is the same process which is monitored. The method contains a second step of "performing a main component transformation due to the acquired information without using information acquired prior to the monitoring method, for calculating a main component measurement vector in a main component space". Thus, the method of claim 1 requires that the main component transformation is performed due to the information acquired in the first step.

The method further recites a third step of "calculating a process indicator quantity by using the calculated main component measurement vector and one or several previously calculated main component measurement vectors". Thus, it becomes clear from the third step that the main component measurement vector, which is calculated by performing a main component transformation due to the information of the process acquired in the first step and a previously calculated component measurement vector is used for calculating a process indicator quantity. Because of the use of the same terminology "main component measurement vector" it is, of course, clear that the previously calculated main component measurement vectors are main component vectors, which have been calculated by performing a main component transformation on information of the process, which have been acquired previously.

The last step of the method recites "detecting an end of the process by using the process indicator quantity". Thus, it becomes clear that the process indicator quantity, which is used for detecting an end of the process is the same process indicator quantity, which is calculated in step 3 by using the calculated main component measurement vector and one or several previously calculated main component measurement vectors, all of which have been calculated by performing a main component transformation due to information of the process, which has been acquired in the first step. Moreover, this fourth step recites to detect "an end of the process". By using the article "the", it is clear that the end which is detected is the same process from which the information has been repeatedly acquired in the first step and which is monitored by the method.

Stark does not disclose the method as recited in claim 1. Stark discloses a data acquisition 200 for acquiring spectral data from measurements by using a sensor 100, for example, by using

spectroscopy, chromatography, thermal analysis, and so on, of a specimen or an object (see, for example, column 8, lines 31 to 35). In fact, Stark measures for a specific object or specimen having the subscript I, a plurality of spectral variables, for example, physical parameters, such as a temperature or chemical parameters (see column 8, lines 53 to 55). Thus, the process from which the Stark information is measured is, for example, a physical or chemical process detected by the sensor 100 wherein the temperature or a concentration of a specimen varies.

As shown above, Applicants' claim 1 requires that the end of a process is detected from which information are repeatedly acquired. The Examiner suggests that step 13 in Stark, column 17, lines 15 and 16, is equivalent to the step of detecting an end of the process by using the process indicator as recited in claim 1. However, the operation described in Stark, column 16, line 64, to column 17, line 16, is not a process which has been sensed by sensor 100 and no measurement data X have been acquired from this process. Stark's measurement data are acquired, for example, from a chemical or physical process of a specimen or an object, as outlined above, whereas the process disclosed in column 16, line 64 to column 17, line 16 is an analytical calculation in order to calculate a vector F from the reference spectra Rkn (see column 16, lines 49 to 55). No measurement data are repeatedly acquired from this analytical calculation process by sensor 100.

If the Examiner's assessment were correct that Stark would disclose a step of repeatedly acquiring information from a process by using the data acquisition 200 and detecting an end of the same process by using a process indicator quantity, there should be at least one flow of information from the data normalizer 300 to the data acquisition 200 in order that the information of the calculation process outlined in column 16, line 48 to column 17, line 16, is transmitted to the data

acquisition 200. However, as outlined in Fig. 2, there is only a flow of data from the data acquisition 200 to the data normalizer 300, but not back from the data normalizer 300 to the data acquisition 200. Again, it is emphasized that the process recited in step 1 of Applicant's claim 1 is the same process as recited in step 4 of claim 1, whereas in Stark the information is acquired from an object or a specimen which is totally different from the analytical process where the "else end" is provided for stopping the iterative calculation disclosed in column 17, lines 15 and 16 from which no information is transferred to the acquisition means 200 but is not determining an end of the process from which information are repeatedly acquired.

Furthermore, please note that there are further inconsistencies in the Examiner's interpretation of the reference. The Examiner asserts that calculator 330 calculates a main component measurement vector and that estimator 320 uses the same calculated main component measurement vector and a previously-calculated main component measurement vector for calculating a process indicator quantity. If the Examiner's assessment were true, then there should be some output of calculator 330 for allowing the calculated main component measurement vector to be input into coefficient estimator 320. However, reference is made to Fig. 3 showing that there is only an input of the raw spectral data Xki from data acquisition 200 (see Fig. 3, upper left comer) and a reference spectra input from orthogonal component generator 360 into coefficient estimator 320. Even if one assumes that the reference spectra input Rks, Rka and Rkj which are input from reference spectra storage 310 into orthogonal component generator 360 and the Pka and Pks input from orthogonal component generator 360 into coefficient estimator 320 would be considered to be previously calculated main component measurement vectors, which, however, is not supported by Stark, then the input of a main component measurement vector in addition to the previously calculated main component measurement vector

from calculator 330 to the coefficient estimator 320 is still not shown in Stark as required by Applicant's claim 1.

Additionally, the Examiner feels that the process described in Stark, column 16, line 48, to column 17, line 16, which is a non-linear model, uses a main component measurement vector. However, in column 15, lines 47 to 51, it is described that in the non-linear model, reference spectral data and the input spectral data itself are involved, and there is no disclosure in Stark that a main component vector or main component variables is used in addition to the reference spectral data in the non-linear model. Thus, the use of a principal components regression is merely limited to treating the reference spectral data Rkn, which is not, nor has to be, the information acquired by the data acquisition 200, as for example in column 9, lines 45 to 56, which describes that the reference spectra represents information about how the qualities sought in the subsequent analysis are expected to affect the input data. In fact, the reference spectra are only based on a measurement of individual species or separate components, see column 9, lines 50 to 52.

Moreover, reference is made to Stark, column 16, lines 32 to 35, describing that the principal component analysis is only used in the linear case, whereas in the non-linear model the coefficients are not determined by a principal component analysis but by a Taylor series. Since the iterative calculation described in column 16, line 48 to column 17, line 16 is a non-linear model using Taylor series linearization, the data Xki are not even calculated by using a multiple linear regression.

Furthermore, it is an important feature of independent claim 1 that the main component transformation is performed without using information acquired prior to the monitoring method. This

is realized in one embodiment by using the first measuring vectors (minimum 2 measurement vectors, then it is trivial) to construct the main component system which is then used for calculating the distance. Since the main component transformation is performed without using information acquired prior to the monitoring method, the system is not dependent on calibration measurements. The invented method and system therefore can be used in a very general and accurate way for determining the end of a process.

Stark does not describe or suggest such a system. Stark describes on page 18, beginning line 12, that the "data normalization ... is based on the use of previously obtained analyte and reference spectra to model multiplicative effects on spectral data". Thus, Stark requires use of at least some information about the process. There is no teaching or suggestion to use the method of Stark without any information. In fact, this is not possible since the method of Stark is based on the use of a model and each model is required to have information for describing the model.

To summarize, claim 1 requires to detect an end of the process which is the same process from which information is acquired repeatedly, which is not shown by Stark, and the method of Stark is based on the use of information which has been acquired prior to the process. Thus, it becomes clear in view of the above that Stark neither discloses the claimed subject matter as specified in claim 1 nor renders same obvious.

The foregoing also applies to independent apparatus claim 9, which corresponds to independent method claim 1.

Clearly, therefore, claims 1 and 9, and the claims dependent therefrom, are not fully met by the cited references within the meaning of 35 USC 102(b), nor are claims 1 - 19 obvious from the Stark reference within the meaning of 35 USC 103.

Since the amendment to the claims does not add more claims than previously paid for, no additional claim fee is required.

In view of the foregoing amendment and these remarks, this application is now believed to be in condition for allowance and such favorable action is respectfully requested on behalf of Applicant.

Respectfully submitted,

Ralph H. Dougherty
Attorney for Applicant
Registration No. 25,851
DOUGHERTY CLEMENTS & HOFER
Suite 300
1901 Roxborough Road
Charlotte, North Carolina 28211
Telephone: 704/366-6643

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